Using Virtual Reality Technologies in Built Environment Education

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Background

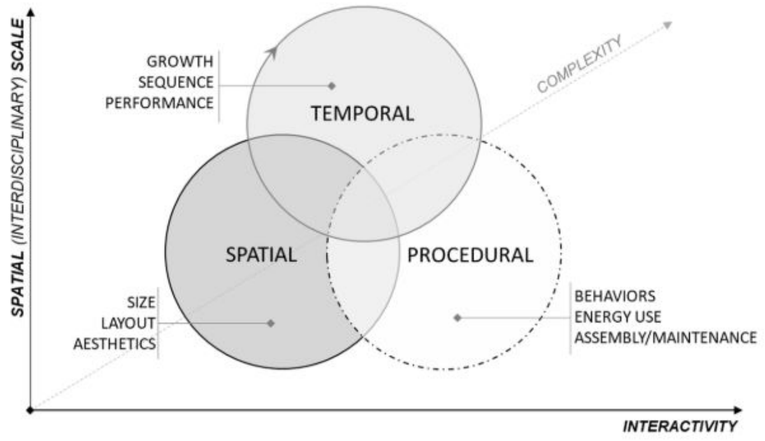
- Future forecast is good both world wide and here at home because VR is becoming more accessible and more user friendly.
- A new vision of VR as a discipline-agnostic platform for integrating the allied design, social, and environmental disciplines to address emerging challenges across the building sector.
- VR in the built environment education refers to the use of immersive technology to enhance teaching and learning experiences related to architecture, engineering, and construction.

Benefits

- Immersive learning experience
- Enhanced hands-on training
- Visualizing complex concepts
- Collaborative learning
- Access to diverse environments
- Enhanced creativity and design skills
- Real-world application
- Interdisciplinary decision making
- Evaluating alternative solutions
- Reduce the need for physical models, site visits, and travel expenses -> cost savings

Trends

- Increased attention to augmented reality (AR) and virtual reality (VR) technologies among those with more industry experience.
- Rise in employees' familiarity and expertise with AR/VR, especially in smaller companies.
- More cost and time savings through AR/VR and building information modeling (BIM)
- Positive trend in acceptance of AR/VR adoption and awareness in the building industry



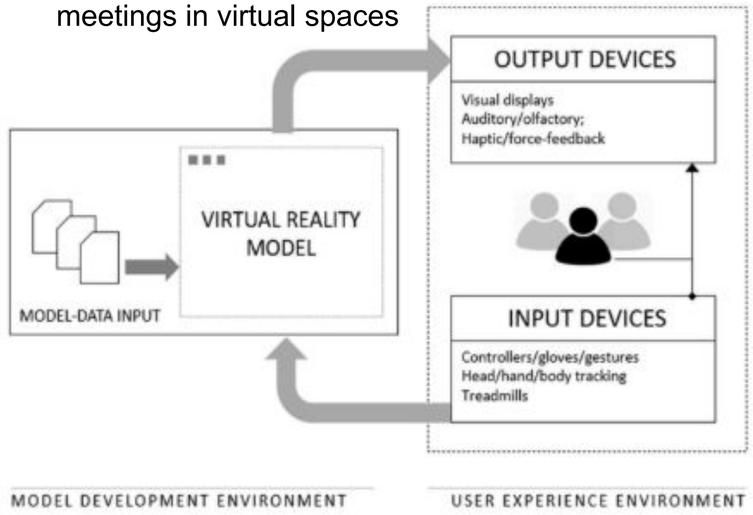
Discipline	Spatial Scale	Time Scale	Tasks/Goals	VR Use and Opportunities
Architectural Design	Site, building space, and components	Long, design for stasis	Aesthetics, functionality, wayfinding, access	Design development, evaluation, design reviews, and design marketing
Engineering Design	Regional, site, systems, & components	Long, design for stasis	Functionality, accessibility	Design testing and review, (dis)assembly, operations training
Construction	Regional, urban, site or systems	Short, temporary	Process-oriented, logistics	Sequencing, clashes, site logistics, equipment operations, & site access

Interdisciplinary Environment

- Challenges:
  - Scale - the engineering design and construction disciplines often operate at a regional scale.
  - Time - Length of time for both architectural and engineering disciplines are complimentary while construction varies.
  - Data - While there is carryover of functionality, the construction industry views it as a tool for process-oriented logistics
- Opportunities: realistic modeling, minimize conflict and miscommunication, and exchange data

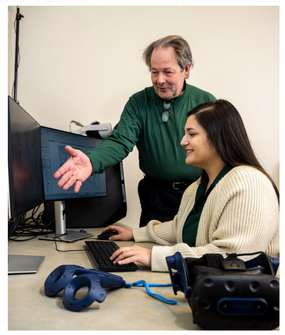
Barriers to Implementation

- Cost and accessibility of the VR headsets and the corresponding display equipment can cause a challenge in higher education.
- Technical complexity, curriculum integration, teaching strategies, facilities, content creation, quality, assessment and evaluation are all challenges that need to be addressed to realize the full potential of VR in enhancing built environment education.
- Upper management's lack of knowledge about AR/VR
- Transferring BIM information and enabling group meetings in virtual spaces



The Future of VR

- Integrate virtual reality usage into school curriculums
- Establish a repository of 3D and VR models for built environment education
- Residential and commercial projects lead in AR/VR, signaling industry-wide growth
- There may be a wider adoption as tools become more accessible and employee familiarity increases



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